

## Functional efficacy of food components and non-nutrient bioactives. A case study: *Phaseolus vulgaris* L.

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Healthy diet is generally believed to have a major influence on both the prevention and development of chronic non-communicable diseases like obesity, diabetes, cardiovascular events, cancer, and osteoporosis. Actually, most food-derived macro and micronutrients, as well as phytochemicals, are able to regulate key metabolic pathways and modulate oxidative stress and inflammatory signalling. Accordingly, interventions designed for healthy eating have become a hot topic in nutritional research and the intake of a number of food is nowadays highly recommended to get and maintain physical and mental health.<sup>1</sup>

The potential of pulses to address nutritional needs, for example, has been recently acknowledged by UN General Assembly, which declared 2016 International Year of Pulses.

Although recognizing their important role in healthy diet, the full set of benefits that pulse crops can offer has not been fully characterized yet, and this results in an intriguing research opportunity.

To raise awareness about the important role of pulses in healthy diets and their contribution to nutrition, we focused our attention on *Phaseolus vulgaris* L. (Zolfino Landraces), a small, pale yellow Tuscan bean coming from the very small mountainous region of Pratomagno, between the provinces of Arezzo and Florence.<sup>2,3</sup>

This particular variety of bean differs from the other ones for the high content of flavonoids, known for their antioxidant and chelating properties. However, it contains also a number of amphiphilic compounds, represented by saponins, whose functional activities have not been thoroughly studied yet. Being characterized by a rigid hydrophobic group, connected via glycoside bonds to hydrophilic oligosaccharide chain, these compounds are acknowledged as natural surfactants able to exert beneficial effects on blood cholesterol levels. However, investigated in depth, saponins proved also to modulate the activity of aldose reductase, a key enzyme of glucose metabolism involved in long term diabetic complications, thus opening up a novel nutritional claim for this kind of pulse.

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2. Romani, A. et al. *J. Agric. Food Chem.*, **2004**, 52, 3838.

3. Balestri, F. et al. *Food & Nutrition Research* **2016**, 60, 31792.